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FIRST DRAFT

The Admissibility of Scientific Evidence in Court

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For well over a century in this country, when a court case, either civil or criminal, involved technical or scientific evidence the standard of admissibility was simple and liberal: the opinions of experts or skilled witnesses were admissible when the subject on which they were offered was so technical that inexperienced persons were unlikely to understand them without explanation. Today all that is changing.

Technical and scientific methods for analyzing evidence have reached new heights in the last 5 years. Courts are interpreting the standards of admissible evidence in new ways. As a result, we are beginning to change the way we look at expert testimony.

A standard for admissible scientific evidence first began developing in 1923 when

James Frye's lawyer tried to introduce at trial the results of an early version of the polygraph (the systolic blood pressure deception test) to show Frye's innocence. The judge refused to allow the test results as evidence, saying Frye had failed to establish the reliability of the test.

Not only did the jury convict Frye of murder, but the district court that heard Frye's appeal upheld the conviction and introduced what was to become the standard of admissibility of scientific evidence for several decades:

> While courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gathered general acceptance in the particular field in which it belongs.[1]

Eight decades after Frye, lawyers routinely bring scientific evidence into the courtroom to assist in proving their cases. But most judges still have little, if any, expertise in many scientific subjects that come before them.

Several recent Supreme Court rulings redefining how judges should gauge admissibility have complicated the issue. Disciplines long accepted and viewed as

"scientific" and "reliable" are now being challenged. Under the new standards, some evidence such as handwriting and hair and fiber analysis, may be inadmissible because they cannot meet the stricter, less flexible criteria.

This article discusses the varying concerns raised by the recent rulings and offers some suggestions to better assist judges in making determinations of admissibility.

What Standards Should Science Meet Before the Court Admits it?

Critics of the principle of "general acceptance," established by the Frye case, argue that it forces judges and juries to make judgments without any independent knowledge or information as to the underlying facts supporting the experts' opinion. Critics add that it forces judges and juries to pick which expert they find more credible.

Over the years, other standards of admissibility have been proposed in an attempt to offer the court guidelines to ensure the admissibility of reliable and relevant evidence. The Frye ruling did not define "general acceptance," but left its interpretation open for the courts. In People v. Kelly[2] in 1976, general acceptance was defined as a consensus drawn from a typical cross section of the relevant, qualified scientific community.[3] General acceptance has also been defined as the

view of a clear majority of the appropriate scientific community.[4]

However, both of these standards are vague and ambiguous. They do not specify how the judge is to determine what the relevant, qualified, or appropriate scientific community is. As a result, courts can give divergent rulings on the same type of evidence, depending on the court's choice of the appropriate scientific community.

If a court wants to admit certain evidence, it can choose to define the appropriate scientific community narrowly to include only those experts who support and employ the specific scientific techniques in question.[5] For example, some courts have admitted voiceprint evidence by narrowly defining the relevant scientific community to include only the developers and practitioners of the technique. [6] Other courts could look to a broader community that might include linguistics or acoustics experts—whomight taken an informed but more critical stance.[7] Judicial interpretations of 'general acceptance' have ranged from "widespread; prevalent; extensive though not universal" [8] to a "substantial section of the scientific community." [9]

Critics of Frye's rigid "general acceptance" requirement favor replacing it with the more relaxed standard of "substantial acceptance."[10] While general acceptance

implies acceptance by a majority of experts in a particular field, substantial acceptance would admit evidence only accepted by a minority within a field. Some courts have already instituted a substantial acceptance standard arguing that it is more in line with the spirit of the Federal Rules of Evidence.

The Federal Rules of Evidence, drafted by a committee of legal scholars and ratified by Congress and the Supreme Court in 1975, are more liberal than Frye when it comes to admitting expert testimony. Federal Rule of Evidence 702 makes admissible a broader range of expert testimony than did Frye. It requires that the evidence assist the trier of fact (rather than have acquired general acceptance within a particular field) and meet a threshold for relevance and reliability. Most States have modeled their admissibility practices after the Federal rules.

Rule 702 made the judge a "gatekeeper," responsible for ultimately determining if testimony is based on good science and will assist the trier of fact. But the rule offers the court no assistance or guidance as to how it is supposed to make that determination. Judges and juries thus have significant leeway in accepting or rejecting expert testimony.

Daubert Rules The Frye Standard Is Too Rigid

One of the main criticisms of Frye was that it lacked a guarantee of scientific validity. For example, certain forensic techniques admitted under the Frye standard, such as voice printing and paraffin test for detection of gunshot residue, are no longer accepted by courts or scientists.

In 1993, the Supreme Court granted *certiorari* in *Daubert v. Merrell Dow Pharmaceuticals*[11] to determine whether the Frye general acceptance test had been superseded by the Federal Rules of Evidence. The issues were whether the standard for admitting expert scientific testimony in a Federal trial was now scientific validity and relevance under Rule 702 rather than the Frye general acceptance test.

Daubert involved petitioners who claimed that their birth defects were caused by their mothers' prenatal ingestion of a prescription antinausea drug called bendectin. They sought to introduce expert testimony to support their claim. The Supreme Court held than an expert opinion not based on epidemiological evidence was inadmissible to establish causation. In so doing, it also decided that the Federal rules *did* trump Frye as the standard of admissibility for scientific evidence.

The Court ruled that the Frye test for general acceptance was too rigid. The

Circuit Court stated, "methods accepted by a minority in the scientific community may well be sufficient" and proposed four factors the trial judge could use in determining whether an expert's testimony met the Federal Rule's requirements for admissibility.[12]

The four factors, which were meant to be suggestive, rather than exhaustive and not necessarily applicable in all instances were:

(1) Whether the theory had been tested.

(2) Whether the theory had been subjected to peer review and publication.

(3) Whether there was a known error rate associated with the technique.

(4) Whether the theory was generally accepted within the scientific community.

Courts before and after Daubert have used factors other than these four to assess the reliability of expert testimony. They include:

- Whether experts are "testifying about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for the purposes of testifying."[13]
- Whether the expert has made an unfounded lea and extrapolated a conclusion from an insufficiently related premise.[14]

- Whether the expert had adequately accounted for obvious alternative explanations.[15]
- Whether the expert "is being as careful as he would be in his regular professional work outside his paid litigation consulting."[16]
- Whether the expert's field is known to reach reliable results in the areas about which the expert would testify.[17]

The Daubert court ruled on established scientific methods. It did not say if its new standard applied to new scientific methods as well.

Fields of investigation that historically have been admitted into court without ever having to show scientific proof of their validity may now find themselves challenged for the first time and subjected to validation studies. For those disciplines, such as fingerprinting, ballistics, handwriting analysis, and microscopic hair comparison, validation data may not exist for the simple reason that no validation studies were ever conducted. If challenged and unable to answer that challenge, their usefulness as evidence may be called into question.

Kumho Tire Extends Daubert to Expert Knowledge

In Daubert, the court specifically stated that its ruling encompassed only scientific evidence and not other types of expert testimony. Whether Rule 702 also applied

to technical and other specialized knowledge was decided in 1999 in *Kumho Tire Co. Ltd. V. Carmichael.*[18]

The Kumho case involved a tire blowout that led to an auto accident in which one of the passengers was killed and others were severely injured. The plaintiff brought suit against the tire manufacturer, claiming that a defect in its construction was the cause of the accident.

The Supreme Court held that Rule 702's reliability standard applies to all scientific, technical, or other specialized matters.[19] It further ruled that in cases involving technical and other specialized knowledge, the Daubert factors may be applied to assess admissibility. However, the court emphasized that these factors are merely a guide to aid in the admissibility determination and that the decision must still be made on a case-by-case basis.

The court also created the possibility that more types of evidence—including methods historically accepted by the courts— will no longer be able to pass through the sanctioned gates of the court.

The Effect on "Junk Science"

Though some legitimate evidence may be unable to meet the increased

admissibility standards under Daubert and Kumho, these standards will serve to rightfully keep out proferred evidence that truly is neither reliable nor helpful. What all this means for so-called "junk science" fields can be illustrated with handwriting analysis.

An observer noted, "Experience with a subject—the claim upon which handwriting expertise mainly rests—is not proof of expertise. If it were, the Earth would still be considered flat."[20] The "science" of analyzing handwriting to determine authorship has long been accepted in court, but it has not been through the same sorts of challenges that other hard sciences have come up against. Under recent rulings, however, whether it is considered a hard science and falls under Daubert or whether it is merely considered a technical expertise that may assist the jury, making it subject to the guidelines of Kumho, the science or "art" of handwriting analysis and questioned document examination is being looked at under a finer microscope than ever before.

What Can We Do: Alternative Methods of Offering Expert Testimony

Though Federal courts have always had the power to seek advice from experts other than those offered by the parties at trial, the practice has seldom been employed. This may partially reflect a feeling by judges that appointed experts of their own choosing somehow disrupts the adversarial process. Because the

Daubert and Kumho decisions open the door to and even *invite* the parties to produce more experts to support their conclusions, the risk exists for a grat courtroom battle of the experts. This would probably cause confusion and further complicate issues that are already complicated enough.

How can the jury avoid having to decide which side's experts are more knowledgeable and credible? How can a judge avoid having to determine whether a party has offered enough evidence to show scientific reliability for its theory, while its opponent's expert testifies that the theory is unreliable? The court has several options and should take advantage of one of more of them:

Appointment of a scientific or technical advisor. A judge has the power to appoint a technical adviser to answer his questions about a technical area so that he can reach a decision about the admissibility of certain testimony. "Such advisors are distinctly different from the experts in an adversarial hearing. [They] are not expert witnesses. They do not contribute directly to the evidence in a case, and a court may or may not permit the parties to depose them.[21] They serve merely to instruct the judge on technical issues, presumably by furnishing unbiased explanatory information.

Appointment of experts. Under the Federal Rules of Evidence, the court can

appoint neutral experts to assist the judge with complex scientific issues either in addition to or instead of the parties' experts. Either party or the judge can call these appointed experts to testify to the merits of the case. Though there may still be a battle between opposing experts, the court-appointed expert can serve as a referee for the court and advise the judge how to rule if it comes down to opposing expert views.

Again, judges have not often invoked this option. In a survey of more than 400 Federal district court judges, only 20 percent had ever used this rule. Reasons for not using it included "concerns about interference with the adversarial process, infrequency of suitable case, difficulty in identifying suitable experts and securing compensation for them, failure to recognize the need early enough in the litigation process, and lack of awareness of the procedure."[22]

To overcome some of these obstacles, a few groups have begun pilot programs to help bridge the gap between the courts and the scientific community. For example, the National Academy of Sciences and the American Association for the Advancement of Science are developing programs to make the appropriate experts available to educate the courts. If the courts feel they have access to informative experts when needed, the hope is that they will adknowledg the need more often and utilize the assistance available.

Appointment of a panel of experts. The appointment of a panel of experts serves the same purpose as the appointment of a technical adviser or expert, with one difference. The panel is asked to "reach a consensus or otherwise make some other kind of joint recommendation." The opinion of a group of experts that agrees on a particular view, especially if the members of the group represent organizations within a field, may carry more weight than the opinion of a single expert.

Appointment of special masters under rule 53. Rule 53 of the Federal Rules of Civil Procedure provides for the appointment of special masters to assist the court. Under the rule, a master may be a referee, an auditor, an examiner, or an assessor. They can be attorneys who have developed a specialty in a particular area of law, scientists, or other technical experts. The purpose of a special master is to "aid the judge in performance of specific judicial duties...and not to displace the court."[23] They bring "to the court skills and experience which courts frequently lack."[24] A master will review the findings and submit a report to the court (subject to the parties' limited right to object). A master also has the authority to rule upon the admissibility of evidence, unless the judge's order forbides, and to put both the parties and witnesses under oath and cross-examine them. A master will then prepare a report, including finds of fact or conclusions of law. In jury actions, the master's report would be admissible as evidence and could be read into the record.

A master need not be held to the same degree of impartiality as a judge, since the court's need to hire individuals with expertise in specific fields is understood.

Rule 53 restricts appointment of masters to jury cases with complicated issues. Cases being decided under Daubert or Kumho, however, are apt to have no difficulty meeting this requirement. Areas in which appointment of special masters has been deemed appropriate include admiralty and maritime claims, antitrust actions, bankruptcy proceedings, civil rights actions, class actions, patent actions, and tax proceedings.

Appointment of a U.S. magistrate. United States magistrates are authorized to make factual determinations based upon the evidence presented at an adversarial hearing and to propose findings as to its admissibility in a written report. A magistrate judge can conduct a pretrial hearing under Federal Rule of Evidence 104 and issue a report recommending for or against admission of certain evidence. A magistrate can conduct a pretrial hearing under Federal Rule of Evidence 104 and issue a report recommending or advising against admission of certain evidence. The magistrate's report does not come into evidence but is used by the district court judge in deciding on the admissibility of the evidence. Admissibility hearings can be lengthy and can involve several witnesses and items of evidence. Judicial economy is served as the district court judge can hear other cases, while

the magistrate presides over the evidentiary hearing.

Proposals to Amend Federal Rule of Evidence 702

The Advisory Committee (of the Federal Judicial Center?) has proposed the following change to Rule 702 in April 1999:

If scientific, technical or other specialized knowledge will assist the judge f fact missing word? to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

The amendment offers the court some basis for how to apply the standard, namely, employing a quantitative assessment under (1). Though it would still be up to the court to determine how much in the way of facts or data proved "sufficient," there is at least an attempt at guidance. In addition, the amendment requires an inquiry into the application of the proposed techniques in the specific case at issue before determining whether the testimony is admissible. The court is also required to determine whether the testimony is the product of "reliable

principles and methods," which it may do through any of the methods suggested above.

Under Daubert and now Kumho, the amount of expert testimony offered in trials is expected to rise. Wading through all the claims of valid new scientific techniques and technical evidence will only become more cumbersome for a judge unless he becomes a bona fide expert himself. Through more widespread adoption of the available alternatives discussed here, a judge can educate himself on issues and make these difficult determinations without having to defer to an expert. The legal questions are thus left to the courts to decide, employing the assistance of the scientific and other expert communities, rather than relying on their judgment.

For More Information

- **The Federal Judicial Center** publishes the *Reference Manual on Scientific Evidence* to explain common types of scientific and technical evidence (including epidemiology, toxicology, forensic DNA, statistics, and economic loss in damage awards) and procedures for determining the admissibility of scientific evidence (including the appointment of experts and special masters). To download or order a copy, visit the FJC Web site at http://www.fjc.gov. Click on "Publications" and scroll down to

"Evidence."

- State Justice Institute??
- National Judicial College??
- American Bar Association??
- American Academy of Forensic Sciences??
- National Center for State Courts??
- National Academy of Sciences??

Notes

1. Frye v. United States, 293 F. 1013, 1013 (D.C. Cir. 1923).

2. People v. Kelly, 17 Cal.3d 24, 28 (1976).

3. People v. Kelly, 17 Cal.3d 24, 36 (1976).

4. People v. Leahy, 8 Cal.4th 587, 612 (1994).

5. Lisa Gonzalez, The Admissibility of Scientific Evidence: The History and Demise of Frye v. United States, 48 Miami L. Rev. 371, 375 (1993).

6. ➔Confronting the New Challenges of Scientific Evidence II. Novel Scientific Evidence in the Courts: History, Doctrine, and Function, 108 Harv. L. Rev. 1490, 1496 (1995) (citing Commonwealth v. Lykus, 327 N.E.2d 671, 678 (Mass. 1975) (quoting People v. Williams, 331 P.2d 251, 254 (Cal. App. Dep't Super. Ct. 1958).

7. Confronting the New Challenges of Scientific Evidence II. Novel Scientific Evidence in the Courts: History, Doctrine, and Function, 108 Harv. L. Rev. 1490, 1496 (1995).

8. ➔Alan W. Tamarelli, Jr., Daubert v. Merrell Dow Pharmaceuticals: Pushing the Limits of Scientific Reliability - The Questionable Wisdom of Abandoning the Peer Review Standard for Admitting Expert Testimony, 47 Vand. L. Rev. 1175, 1186-7 (1994) (citing United States v Downing, 753 F.2d 1224, 1236 (3d Cir. 1985) (citing United States v. Zeiger, 350 F.Supp. 685, 688 (D.D.C. 1972), rev'd, 475 F.2d 1280 (D.C. Cir. 1972).

9. ➔Alan W. Tamarelli, Jr., Daubert v. Merrell Dow Pharmaceuticals: Pushing the Limits of Scientific Reliability - The Questionable Wisdom of Abandoning the Peer Review Standard for Admitting Expert Testimony, 47 Vand. L. Rev. 1175, 1186-7 (1994) (citing United States v Downing, 753 F.2d 1224, 1236 (3d Cir. 1985)(quoting United States v. Williams, 443 F.Supp. 269, 273 (S.D.N.Y. 1977), aff'd, 583 F.2d 1194 (2d Cir. 1978).

10. Michael Graham, Modern State and Federal Evidence: A Comprehensive Reference Text 329 (1989); Charles T. McCormick, McCormick on Evidence s 203, at 875 n.30 (John Strong ed. 4th ed. 1992).

11. Daubert v. Merrell Dow Pharmaceuticals, 113 S.Ct. 2786 (1993).

12. Daubert v. Merrell Dow Pharmaceuticals, 113 S.Ct. 2786, 2798-9 (1993).

13. Daubert v. Merrell Dow Pharmaceuticals, 43 F.3d 1311, 1317 (9th Cir. 1995).

14. See General Electric v. Joiner, 118 S.Ct. 512, 519 (1997) (noting that in some cases a trial court "may conclude that there is simply too great an analytical gap between the data and the opinion proffered"). See also Daubert v. Merrell Dow Pharmaceuticals, 43 F.3d 1311, 1319 (9th Cir. 1995) (noting that personal opinion, not science, is testifying).

15. See Claar v. Burlington N.R.R., 29 F.3d 499 (9th Cir. 1994) (expert's testimony excluded when the expert failed to consider other obvious causes for plaintiff's condition). See also Daubert v. Merrell Dow Pharmaceuticals, 43 F.3d 1311, 1319 (9th Cir. 1995) (excluding expert's testimony noting that "Dr. Palmer

offers no tested or testable theory to explain how, from this limited information, he was able to eliminate all other potential causes of birth defects . . .").

16. Sheehan v. Daily Racing Form, Inc., 104 F.3d 940, 942 (7th Cir. 1997).

17. Kumho Tire Co. Ltd., v. Carmichael, 119 S.Ct. 1167 (1999).

18. Kumho Tire Co. Ltd., v. Carmichael, 119 S.Ct. 1167 (1999).

19. Kumho Tire Co. Ltd., v. Carmichael, 119 S.Ct. 1174 (1999) (citing Daubert v. Merrell Dow Pharmaceuticals, 113 S.Ct. 2786, 2795 n.8 (1993)).

20. David L. Faigman, A Look at . . . Experts in the Courtroom, A Way to Sort out Science from Spin, Washington Post, B03, 8-22-99.

21. Bert Black, Francisco J. Ayala, Carol Saffran-Brinks, Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge, 72 Tex. L. Rev. 715, 794 (1994).

22. Bert Black, Francisco J. Ayala, Carol Saffran-Brinks, Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge, 72 Tex. L. Rev. 715, 795 (1994) (citing Joe S. Cecil & Thomas E. Willging, Court-Appointed Experts Defining the Role of the Experts Appointed Under Federal Rule of Evidence 706, at 18-23 (1993)).

23. Fed. R. Civ. P. 53, n.6.

24. Ibid.